

I CLAIM:

1. A method of improving the stabilization of invertebrate discs by reducing the bending hysteresis of scoliotic spines comprising the step of:

5 contacting at least a portion of a collagenous tissue within the discs with an effective amount of a crosslinking reagent.

2. A method of improving the stabilization of invertebrate discs by increasing the bending stiffness of scoliotic spines comprising the step of:

10 contacting at least a portion of a collagenous tissue within the discs with an effective amount of a crosslinking reagent.

3. The method of claims 1 or 2, wherein the crosslinking reagent is injected into the convex side of discs involved in the scoliotic spine.

15 4. The method of claims 1 or 2, further comprising performing corrective surgery to stabilize the discs.

5. The method of claims 1 or 2, further comprising wearing an external brace to stabilize the discs.

20 6. The method of claims 1 or 2, wherein the crosslinking reagent is selected from the group consisting of genipin, proanthocyanidin, ribose, threose, and lysyl oxidase.

25 7. The method of claims 1 or 2, further comprising contacting at least a portion of a collagenous tissue within the tissues adjacent to the discs with an effective amount of a crosslinking reagent.

8. The method of claims 1 or 2, wherein the contact between the collagenous tissue and the crosslinking reagent is effected by placement of a time-release delivery system directly into or onto the portion of the collagenous tissue.

5 9. The method of claims 1 or 2, further comprising using three-dimensional reconstructions of the collagenous tissue to determine where to contact the collagenous tissue with the crosslinking reagent.

10 10. A device for improving the stabilization of invertebrate discs by reducing the bending hysteresis of scoliotic spines comprising:
a crosslinking reagent.

15 11. A device for improving the stabilization of invertebrate discs by increasing the bending stiffness of scoliotic spines comprising:
a crosslinking reagent.

12. The device according to claims 10 or 11 further comprising a syringe and needle for injecting the crosslinking reagent.

20 13. The device according to claims 10 or 11 further comprising a time-release delivery system for the crosslinking reagent.

25 14. The device according to claim 12, wherein the crosslinking reagent is injected into the convex side of discs involved in the scoliotic spine.

15. The device according to claims 10 or 11, wherein the crosslinking reagent is selected from the group consisting of genipin, proanthocyanidin, ribose, threose, and lysyl oxidase.

16. The device according to claim 13, wherein the time-release delivery system is selected from the group consisting of an imbedded pellet, a time release capsule, a treated membrane, a patch, a gel, and an ointment.

5 17. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for improving the stabilization of invertebrate discs by reducing the bending hysteresis of scoliotic spines comprising one or more of the following:

container containing an effective amount of a crosslinking reagent;

10 container containing premeasured amount of a solvent for dissolving the crosslinking reagent;

syringe with needle, or other means for injecting a crosslinking reagent;

time release capsule for releasing a crosslinking reagent;

15 time release capsule insertion device for aiding in the delivery of a crosslinking reagent;

container of gel or ointment comprising a crosslinking reagent;

gel or ointment application device for applying the crosslinking reagent;

treated patch comprising a crosslinking reagent;

20 minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.

18. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for improving the stabilization of invertebrate discs by increasing the bending stiffness of scoliotic spines comprising one or more of the following:

- 5 container containing an effective amount of a crosslinking reagent ;
- container containing premeasured amount of a solvent for dissolving the crosslinking reagent;
- syringe with needle, or other means for injecting a crosslinking reagent;
- time release capsule for releasing a crosslinking reagent;
- 10 time release capsule insertion device for aiding in the delivery of a crosslinking reagent;
- container of gel or ointment comprising a crosslinking reagent;
- gel or ointment application device for applying the crosslinking reagent;
- treated patch comprising a crosslinking reagent;
- 15 minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.

19. A method of increasing the permeability of the outer region of an intervertebral disc, the annulus fibrosus, wherein the fluid flux to and from the
20 central region, or nucleus pulposus, of the intervertebral disc is improved, comprising the step of:

contacting at least a portion of a collagenous tissue within the disc with an effective amount of a crosslinking reagent.

20. A method of increasing the permeability of an intervertebral disc and increasing the fluid flux to the central region of the disc, wherein the flow of nutrients to cells within the central region of the disc is increased and the flow of cell waste products and degraded matrix molecules from the cells within the central region of the disc are increased, comprising the step of:

contacting at least a portion of a collagenous tissue within the disc with an effective amount of a crosslinking reagent.

21. A method of increasing the biological viability of cells in the central region of the intervertebral disc, comprising the step of:

contacting at least a portion of a collagenous tissue within the disc with an effective amount of a crosslinking reagent.

22. A device for increasing the permeability of the outer region of an intervertebral disc, the annulus fibrosus, wherein the fluid flux to and from the central region, or nucleus pulposus, of the intervertebral disc is improved, comprising:

a crosslinking reagent.

23. A device for increasing the permeability of an intervertebral disc and increasing the fluid flux to the central region of the disc, wherein the flow of nutrients to cells within the central region of the disc is increased and the flow of cell waste products and degraded matrix molecules from the cells within the central region of the disc are increased, comprising:

a crosslinking reagent.

24. A device for increasing the biological viability of cells in the central region of the intervertebral disc, comprising:

a crosslinking reagent.

25. The device according to claims 22, 23, or 24 further comprising a syringe and needle for injecting the crosslinking reagent.

5 26. The device according to claims 22, 23, or 24 further comprising a time-release delivery system for the crosslinking reagent.

27. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for improving the resistance of collagenous tissue to
10 mechanical degradation comprising one or more of the following:

container containing an effective amount of a crosslinking reagent;

container containing premeasured amount of a solvent for dissolving the crosslinking reagent;

syringe with needle, or other means for injecting a crosslinking reagent;

15 time release capsule for releasing a crosslinking reagent;

time release capsule insertion device for aiding in the delivery of a crosslinking reagent;

container of gel or ointment comprising a crosslinking reagent;

gel or ointment application device for applying the crosslinking reagent;

20 treated patch comprising a crosslinking reagent;

minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.

28. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for increasing the permeability of the outer region of an intervertebral disc, the annulus fibrosus, wherein the fluid flux to and from the central region, or nucleus pulposus, of the intervertebral disc is improved
5 comprising one or more of the following:

container containing an effective amount of a crosslinking reagent ;

container containing premeasured amount of a solvent for dissolving the crosslinking reagent;

syringe with needle, or other means for injecting a crosslinking reagent;

10 time release capsule for releasing a crosslinking reagent;

time release capsule insertion device for aiding in the delivery of a crosslinking reagent;

container of gel or ointment comprising a crosslinking reagent;

gel or ointment application device for applying the crosslinking reagent;

15 treated patch comprising a crosslinking reagent;

minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.

29. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for increasing the permeability of an intervertebral disc and increasing the fluid flux to the central region of the disc, wherein the flow of nutrients to cells within the central region of the disc is increased and the flow of cell waste products and degraded matrix molecules from the cells within the central region of the disc are increased comprising one or more of the following:

container containing an effective amount of a crosslinking reagent;

container containing premeasured amount of a solvent for dissolving the crosslinking reagent;

syringe with needle, or other means for injecting a crosslinking reagent;

time release capsule for releasing a crosslinking reagent;

time release capsule insertion device for aiding in the delivery of a crosslinking reagent;

container of gel or ointment comprising a crosslinking reagent;

gel or ointment application device for applying the crosslinking reagent;

treated patch comprising a crosslinking reagent;

minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.

30. A sterile reagent and application tray enclosed in packaging with a sterile inner surface, for increasing the biological viability of cells in the central region of the intervertebral disc comprising one or more of the following:

container containing an effective amount of a crosslinking reagent ;

5 container containing premeasured amount of a solvent for dissolving the crosslinking reagent;

syringe with needle, or other means for injecting a crosslinking reagent;

time release capsule for releasing a crosslinking reagent;

10 time release capsule insertion device for aiding in the delivery of a crosslinking reagent;

container of gel or ointment comprising a crosslinking reagent;

gel or ointment application device for applying the crosslinking reagent;

treated patch comprising a crosslinking reagent;

15 minimally invasive device for application of crosslinking reagent via a treated patch, gel, ointment, time release capsule, or injectable.